

## CLAIMS

### WHAT IS CLAIMED IS:

1. A method for analyzing a measurement, comprising:
  - a) programming a measurement device with a predetermined trigger value corresponding to a characteristic of interest detected by said measurement device;
  - b) recording a first set of data by said measurement device to a first location;
  - c) recording a second set of data by said measurement device to a second location, wherein said second set of data corresponds to a time of occurrence for said trigger value and said first set of data corresponds to a time prior to said occurrence;
  - d) playing said first and second sets of data at a time after said occurrence on a simulator of said measurement device, said simulator suitable to operate on said first and second sets of data to produce simulator output data, said output data being smaller than said first and second sets of data.
2. The method of claim 1, said first set of data including first temporal information and said second set of data including second temporal information.
3. The method of claim 1, further comprising:
  - e) recording a third set of data by said measurement device to a third location, wherein said third set of data corresponds to a time after said occurrence;
  - f) playing said third set of data on said simulator.

4. The method of claim 3, said first set of data including first temporal information, said second set of data including second temporal information, and said third set of data including thirds temporal information.
5. The method of claim 1, wherein said measurement device provides measurement device output data, said simulator output data being identical to said measurement device output data.
6. The method of claim 1, said measurement device being an ultrasonic flow meter.
7. The method of claim 1, wherein said characteristic of interest is time of flight for an ultrasonic signal.
8. The method of claim 1, said playing step being conducted on a portable computer.
9. The method of claim 1, wherein said first and second locations are on a hard disk drive.
10. The method of claim 1, said simulator including a signal processing chain substantially similar to one located in said measurement device.
11. A method for analyzing a measurement device performance, comprising:
  - a) recording an uninterrupted stream of data from said measurement device to a first location, said measurement device having a measurement portion to detect a characteristic of

interest and generate said uninterrupted stream of data, said uninterrupted stream of data being of a substantially longer duration than fluctuations in said characteristic of interest;

b) retrieving said stream of data from said first location; and

c) playing said uninterrupted stream of said data on a replay device, said replay device suitable to process said stream of data in a substantially similar manner as electronics associated with said measurement device.

12. The method of claim 11, wherein said characteristic-of-interest does not satisfy a pre-set trigger, preset trigger condition at a second time, said uninterrupted stream of data being from said first time through some time after said second time.

13. The method of claim 11, wherein said measurement device is an ultrasonic meter.

14. The method of claim 11, wherein said first location is a hard disc drive.

15. The method of claim 11, wherein said replay device is a portable computer.

16. The method of claim 11 further comprising:

d) stopping said playing of said uninterrupted stream of data in order to analyze data from a single instant in time.

17. The method of claim 11, wherein the duration of said uninterrupted stream of data is at least greater than one hour.

18. The method of claim 11, wherein the duration of said uninterrupted stream of data is several minutes.

19. The method of claim 11, wherein said reply device processes said uninterrupted stream of data in substantially identical manner as said electronics.

20. The method of claim 11, wherein said step of playing occurs at a time later than said recording and at a location other than said measurement device.

21. The method of claim 11, further comprising transmitting said uninterrupted stream of data wirelessly prior to said step of recording.

22. A measurement device diagnostic system, comprising:  
a measurement device for taking measurements of a characteristic of interest;  
a processor not located in said measurement device;  
means to record data corresponding to said measurements to a memory device; and  
means to transmit said data from said memory device to said processor.

23. The measurement device diagnostic system of claim 22, wherein said measurement device is an ultrasonic meter.

24. The measurement device of claim 22, wherein said measurement device records data continuously to said measurement device.

25. The measurement device of claim 22, wherein said processor is in a portable computer.

26. A method for analyzing measurement data from a measurement device, comprising:

a) measuring a characteristic-of-interest in a medium by a measurement device to produce measurement data at a measurement data acquisition rate;

b) producing output data at an output data rate from said measurement device, said output data being based on said measurement data, wherein said output data rate is lower than said measurement data acquisition rate;

c) recording said measurement data from said measurement device to a first location;

d) transmitting temporal data corresponding to said measurement data along with said measurement data from said first location to a second location, said second location being outside of said measurement device; and

e) playing said measurement data from said second location on a simulator, said simulator being outside said measurement device, said simulator being programmed to provide a set of output data that substantially reproduces the characteristic-of-interest recorded at said first location.

27. The method of claim 26, wherein said step of recording begins by a manual actuation.

28. The method of claim 27, wherein said manual actuation includes a switch on said measurement device.

29. The method of claim 26, wherein said step of recording begins by an automatic response by said measurement device to a condition.
30. The method of claim 26, wherein said temporal data are timestamps.
31. The method of claim 26, said method being deterministic.
32. The method of claim 26, said measurement device being an ultrasonic flow meter.
33. The method of claim 26, said simulator being programmed to include a signal processing chain the same as one programmed in said measurement device.
34. The method of claim 26, said output data from said simulator being the same as said output data from said measurement device with respect to said characteristic of interest.
35. The method of claim 26, said output data from said simulator being identical to said output data from said measurement device.